PARAMETRISATION OF AGGREGATED ROUGHNESS AND SENSIBLE HEAT FLUX FROM FIELD SCALE TO HYDROLOGICAL SCALE BY MICROSCALE MODELLING IN THE ALPILLES EXPERIMENT IN FRANCE.

C. B. Hasager (1), A. Olioso (2) and F. Jacob (3)

(1) Risoe National Laboratory, Windenergy Department, Atmospheric Physics Programme, P.O.Box 49, Frederiksborgvej 399, DK-4000 Roskilde, Denmark (tel +45 4677 5014, fax +45 4677 5970, charlotte.hasager@risoe.dk, http://www.risoe.dk/vea), (2) INRA Bioclimatologie, Domaine Saint-Paul, Avignon, France, F-84914 Avignon Cedex 9, France, (3) USDA/ARS Hydrology and Remote Sensing Laboratory, Beltsville, MD, USA

Airborne remote sensing data provides data for a very high-resolution land use map with the roughness changes in each crop type estimated from plant parameteres through time in the Alpilles region in southern France. There are 18 surface temperature maps from an airborne scanner and a series of radiosoundings. Further are data of the sensible surface heat flux measured by the eddy correlation technique collected in several crops. Based on this large data set a microscale aggregation model has been used to calculate the spatial variations in surface sensible heat flux. The results are compared to field observations. The aggregation model is a linearized version of the atmospheric flow equation in two dimensions in the horizontal domain. It is a very fast model because the equations are solved by Fast Fourier Transforms. Basically the model "remembers" all upwind conditions related to inhomogeneities in surface temperature and aerodynamic roughness changes. The resolution of the surface sensible heat flux maps is 20 m. Area-averages of surface heat flux e.g. at a 1 km resolution, would be relevant for comparison to NOAA AVHRR-based flux mapping for larger regions such as the Mediterranean area. This work is carried out as part of the EU WATERMED project (WATter use Efficiency in natural vegetation and agricultural areas by Remote sensing in the MEDiterranean basin) that aims at estimating the hydrological status at large regional scale.